Oxford Cambridge and RSA

OCR-set Assignment

Sample Assessment Material

OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Human Biology

Unit F173: Biomedical techniques

Scenario Title: S1 Pharmaceuticals

Valid for assessment from September 20XX to 20XX.
For use by students beginning the qualification in September 20XX.

This is a sample OCR-set assignment which should only be used for practice**.**

This assignment **must not** be used for live assessment of students.

The live assignments will be available on our secure website, 'Teach Cambridge'.

The OCR administrative codes linked to this unit are:

- unit entry code F173
- certification code H049/H149

The regulated qualification numbers linked to this unit are:

610/3945/7 610/3946/9

Duration

About:

- 20 hours of supervised time (GLH)
  (work that **must** be completed under teacher supervised conditions)
- 5 hours of unsupervised time
  (work that students can complete independently without teacher supervision)

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assessment.

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Information and instructions for Teachers

Using this assignment

This assignment provides a scenario and set of related tasks that reflect how people would plan and perform investigations involving biomedical techniques.

You can give this to students on or after 1 June 202X to help them understand it before they start using it for assessment. The dates for which students can use it for assessment are shown on the front cover.

The assignment:
- Is written so that students have the opportunity to meet the requirements of all assessment criteria for the unit.
- Will tell students if their evidence must be in a specific format. If the task does not specify a format, students can choose the format to use.
- **Must** be completed under teacher supervision. Any unsupervised time allowed will be stated below and explained in the assessment guidance.

We have estimated that this assignment will take about 20 hours of supervised time and 5 hours of unsupervised time to complete. Students should need approximately:
- 6 hours to complete Task 1
- 6 hours to complete Task 2
- 7 hours to complete Task 3
- 6 hours to complete Task 4

You **must**:

- Use an OCR-set assignment for summative assessment of students.
- Familiarise yourself with the assessment criteria and assessment guidance for the tasks. These are given at the end of each student task. They are also with the unit content in **Section 5** of the Specification.
  Assessment guidance is only given where additional information is needed. There might not be assessment guidance for each criterion.
- Make sure students understand that the assessment criteria and assessment guidance tell them in detail what they need to do in each task.
- Read and understand **all** the rules and guidance in **Section 7** of the Specification **before** your students start the set assignments.
- Make sure that your students complete the tasks and that you assess the tasks fully in line with the rules and guidance in **Section 7** of the Specification.

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- Give your students the Human Biology **Student guide to NEA assignments before** they start the assignments.
- Complete the **Teacher Observation Record** for **Task 2**. You **must** follow the guidance given when completing it.
- Question the students about the research completed, to be satisfied that the research was independently completed by the student.

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You **must not**:

- Use live OCR-set assignments for practice or formative assessment. This sample assessment material **can** be used for practice or formative assessment.
- Use this sample assessment material for live assessment of students.
- Allow group work for **any** task in this assignment.
- Change any part of the OCR-set assignments or assessment criteria.

Information for delivering tasks

Task	Requirements
1 and 2	See accompanying 'Technician notes' for guidance for setting up samples for investigation.

Pages 1-4 are for teachers only. Please do **not** give **Pages 1-4** to your students.

You can give **any** or **all** of the pages **that follow** to your students.

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Tasks for students and assessment criteria

Unit F173: Biomedical techniques

Scenario Title: S1 Pharmaceuticals

Valid for assessment from September 20XX to 20XX.
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Scenario

You are a Biomedical Research Scientist working for S1 Pharmaceuticals. You have been given several anonymous samples from colleagues in another laboratory in S1 Pharmaceuticals. You have also been given information about three patients who might match the anonymous samples. The laboratory has asked you to suggest what disease each of the patients may have.

The samples you have received are one urine sample and two plasma samples. You will need to plan and carry out a series of tests to match the samples to the patients. The results of the tests will be analysed and you will need to produce a report stating which sample belongs to which patient.

Patient symptoms taken from their clinical notes:

Patient A

This patient is feeling constantly tired and has had sudden weight loss. Their eyesight is blurred. Recently they had a cut on their toe that took longer to heal than they were expecting.

Patient B

This patient has had several seizures and is showing signs of irritability. They have dry scaly skin and have a very pale complexion.

Patient C

This patient is constantly feeling weak and tired. They have had pains in their legs and have recently been bruising easily.

You have practical equipment available to you to help match the samples given to the three patients. You will complete risk assessments and plan the investigations, make notes of the outcomes and research the patients' symptoms to match the results.

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Task 1

Researching the patients and planning the investigation

Topic Areas 1, 2, 3 and 4 are assessed in this task.

The task is:

Research the symptoms of the patients and plan the investigation into the samples.

- You will research the symptoms of the patients and which diseases the symptoms could relate to.
- You will then plan how you will conduct investigations of the unidentified samples.

Your evidence **must** include:

- Written evidence
- The plan for the investigation
- A completed risk assessment.

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P1: Use research to **identify** a range of potential diseases that the patients might have. (PO4)	**M1: Assess two** suspected diseases for **each** patient in terms of potential likelihood given the symptoms. (PO3)	
P2: Create a method for the investigation including the appropriate tests and techniques to investigate the unidentified samples based on suspected diseases of the patients. (PO4)	**M2: Explain** the rationale for the tests and techniques chosen based on the suspected diseases identified in **M1**. (PO2)	**D1: Justify** the choice of appropriate equipment for the chosen tests and techniques. (PO3)
P3: Complete an appropriate risk assessment for your investigation. (PO4)		

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Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P1	• Teachers must discuss with students the research they completed independently to inform their research question, giving students the opportunity to say: o What research they completed o How they completed it o Why they used the research methods they did. • Students must use research to identify a range of potential diseases that each patient might have, based on their symptoms. • Students must identify **at least four** potential diseases that the patients might have. • The research element of this criterion does **not** need to be completed under teacher supervised conditions but is necessary in order for students to access the criterion.
P2	• Students must provide a step-by-step method for their investigation. It needs to include all the equipment they wish to use, including size, quantities and PPE, as appropriate. • Students should consider the tests and techniques available to them, practical equipment available to them, samples provided and information from **P1**.
P3	• Students must use the risk assessment template provided to complete a risk assessment for their investigation, considering risks and hazards for each test and technique.
M1	• **M1** is an extension of **P1**. • Students must give a reasoned judgement for why **two** diseases are suspected for **each** patient, in terms of the likelihood given the symptoms. • Students must include a hypothesis for the suspected diseases for **each** patient. • The reasoned judgement is informed by relevant facts based on the symptoms given and research completed.
M2	• **M2** is an extension of **P2** and **M1**.
D1	• **D1** is an extension of **M2**. • Students might justify the settings of their equipment as part of the choice for the tests and techniques.

Advice:

- Remember to clearly reference any information used from books, websites or other sources to support your evidence.

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- Following the completion of **Task 1**, your teacher will need to ensure that your planned investigation is safe for you to carry out in your school laboratory.

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Task 2

Performing the investigation of unidentified samples

Topic Areas 4 and 5 are assessed in this task.

The task is:

Perform your planned investigation of the unidentified samples.

- You will generate data to help determine which patient the samples belong to in Task 3.

Your evidence **must** include:

- Written evidence
- A Teacher Observation Record Form.

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P4: Perform the planned investigation safely. (PO4)	**M3: Explain** how control variables have been managed when undertaking the investigation. (PO2)	**D2: Collect** sufficient, valid data for all samples with appropriate precision. (PO4)
P5: Explain how the integrity of the samples is maintained. (PO2)		
P6: Record the data obtained in appropriate ways using correct conventions and units. (PO4)		

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Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P4	• Students must follow their method safely. • Students must be able to perform the task safely to achieve this criterion. Staff must intervene if safe working practices are not being followed but where this happens the criteria cannot be awarded. • Teachers must complete a 'Teacher Observation Record' for each student to evidence they have met this criterion. Students must also read and sign it. • The teacher observation record form should describe how the student performed the planned investigation safely.
P6	• A results table may be appropriate for most investigations, but qualitative descriptions are also suitable.
D2	• The teacher observation record form could comment on the skilful use of apparatus and the accuracy and precision of data collected.

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Task 3

Justifying which sample and disease corresponds to which patient

Topic Areas 1, 4 and 5 are assessed in this task.

The task is:

Justify which patient each sample belongs to and the disease each patient has.

- You will need to process the data collected in your investigations from Task 2.
- You will need to use established value ranges to compare with your data.

Your evidence **must** include:

- Written evidence.

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P7: Use standard mathematical techniques to **process** data. (PO2)	**M4: Calculate** percentage uncertainties for the investigation. (PO2)	**D3: Explain** the sources of error and possible reasons for any anomalous data. (PO2)
P8: Use research to **compare** your data with established value ranges. (PO4)	**M5: Justify** which patient each sample belongs to. (PO3)	**D4: Justify** which disease each patient has. (PO3)
P9: Analyse the results of the investigation in the context of the suspected diseases for the patients from **M1**. (PO3)		

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Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P7	• Students must use mathematical skills identified in Appendix D of the specification to process their data appropriately. • Students must show **at least one** example of their working out in the written evidence.
P8	• Students must use research to determine the correct established value ranges to compare with their data. • The research element of this criterion does **not** need to be completed under teacher supervised conditions but is necessary in order for students to access the criterion.
M4	• Students must determine the percentage uncertainty on each piece of equipment used and the combined uncertainty for each repeat. • They must show **at least one** example of their working out in the written evidence.
M5	• **M5** is an extension of **P9**.
D3	• This should be done qualitatively only. • Students who have no anomalous data to explain should clarify this in their written evidence.
D4	• **D4** is an extension of **M5**.

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Task 4

Reviewing your investigation

Topic Areas 2, 3 and 5 are assessed in this task.

The task is:

Review your investigation.

- You will need to review your whole investigation, including all **Tasks 1, 2 and 3**.

Your evidence **must** include:

- Written evidence.

Use the assessment criteria below to tell you what you need to do in more detail.

Pass	Merit	Distinction
P10: Explain the limitations of the data collected. (PO2)	**M6: Evaluate** the sources of information researched in **Task 1** and established value ranges in **Task 3**. (PO3)	**D5: Justify** suggestions for any improvements that could be made. (PO3)
P11: Suggest other tests or techniques that could be undertaken to support the diagnosis suggested for the patients. (PO2)	**M7: Analyse** the strengths of the investigation. (PO3)	
P12: Assess the effectiveness of the methods used to collect data. (PO3)		

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Assessment Guidance

This assessment guidance gives you information to meet the assessment criteria. There might not be additional assessment guidance for each criterion. It is only given where it is needed. You must read this guidance before you complete your evidence.

Assessment Criteria	Assessment guidance
P12	• Students must offer a reasoned judgement of the effectiveness of the methods used to collect data. • Students will inform their judgement with relevant information about how well they were able to collect good quality data with the techniques and equipment chosen during the investigation.
M6	• Students must make reasoned judgements on their confidence in the sources used throughout the investigation, e.g. those used to design the method, create the risk assessment, establish value ranges and the secondary data, with reference to reliability and validity.
D5	• Give valid reasons for improvements to the investigation that would improve the conclusion(s) or help answer the research question. • Processed data should be used to support any recommendations. • If no improvements can be recommended, then this needs to be justified using evidence from the investigation.

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Endorsement

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Teacher Authentication Form

Student name:	
Qualifications:	OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Human Biology (Certificate)/(Extended Certificate)
Unit number and title:	F173
	Biomedical techniques
Task:	Scenario title: S1 Pharmaceuticals
	Task number: 1

This form must be attached to the student's evidence for assessment purposes.

Student declaration

Research information - complete this to say:

- ☐ What research you completed
- ☐ How you completed it
- ☐ Why you used the research methods you did.

I confirm that the research completed to inform my research question, is my own.

Student signature **Date**

D	D	M	M	Y	Y	Y	Y

Teacher declaration

I have authenticated the student's research and methods used and am satisfied (to the best of my knowledge) that the research was conducted by the student independently and is solely their own work.

Teacher signature **Date**

D	D	M	M	Y	Y	Y	Y

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Teacher Observation Record Form

Use this form to record what is observed.
Read the **guidance notes** below the form **before** you complete the form.

OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Human Biology (Certificate)/(Extended Certificate)

Unit number:	F173
Unit title:	Biomedical techniques
Task number:	2
Task title:	Performing the investigation of unidentified samples

Student's name:	
Date the activity was completed:	

What extra evidence is attached to the form?	

The **teacher** fills in this section:

This activity relates to Assessment Criterion **P4.** You **must** describe in detail how the student performed the planned investigation safely.
How does the activity meet the requirements of the Assessment Criteria? You **must** describe: 1. what the student did 2. how it relates to the relevant Assessment Criteria.

Teacher's name:	
Teacher's signature:	
Date:	

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The **student** fills in this section:

I agree with my teacher's description of how I completed this activity Yes ☐	
Use this space to make any extra comments.	
Student's signature:	
Date:	

Guidance notes

Both the teacher **and** the student are responsible for completing this form.

The **teacher must**:
- use the form to describe in detail what they observed the student doing.
- give contextualised details of what the student did and how this relates to the Assessment Criteria.
- say how well the activity was completed in relation to the Assessment Criteria with reasons.
- share what they have written with the student and offer the opportunity to discuss if the student disagrees with what is written.
- reach agreement with the student before the work is submitted for moderation.
- sign and date the form as evidence of agreement.

The **student must**:
- reach agreement with the teacher before the work is submitted for moderation.
- use the form to show that they agree with the teacher's record of the activity observed.
- sign and date the form as evidence of agreement.

The form **must**:
- be accompanied by extra evidence, as required by the task.
- provide evidence that is individual to the student.

The form **must not**:
- contain a simple repeat of the Assessment Criteria.
- contain just a list of skills.
- be completed by anyone other than the teacher observing the activity and the student completing the activity.
- be written by the student for the teacher to sign.
- be used to evidence achievement of a whole unit or task in isolation.

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Risk Assessment Template

Title of investigation	
Candidate name	
Date completed	

Hazardous chemical, procedure or equipment	Hazard	Risk	Control measures	Emergency measures

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NEA Command Words

The table below shows the command words that may be used in the NEA assignments and/or assessment criteria.

Command Word	Meaning
Adapt	• Change to make suitable for a new use or purpose
Analyse	• Separate or break down information into parts and identify their characteristics or elements • Explain the different elements of a topic or argument and make reasoned comments • Explain the impacts of actions using a logical chain of reasoning
Assess	• Offer a reasoned judgement of the standard or quality of situations or skills. The reasoned judgement is informed by relevant facts
Calculate	• Work out the numerical value. Show your working unless otherwise stated
Classify	• Arrange in categories according to shared qualities or characteristics
Compare	• Give an account of the similarities and differences between two or more items, situations or actions
Conclude	• Judge or decide something
Describe	• Give an account that includes the relevant characteristics, qualities or events
Discuss (how/whether/etc)	• Present, analyse and evaluate relevant points (for example, for/against an argument) to make a reasoned judgement
Evaluate	• Make a reasoned qualitative judgement considering different factors and using available knowledge/experience
Examine	• To look at, inspect, or scrutinise carefully, or in detail
Explain	• Give reasons for and/or causes of something • Make something clear by describing and/or giving information
Interpret	• Translate information into recognisable form • Convey one's understanding to others, e.g. in a performance
Investigate	• Inquire into (a situation or problem)
Justify	• Give valid reasons for offering an opinion or reaching a conclusion
Research	• Do detailed study in order to discover (new) information or reach a (new) understanding
Summarise	• Express the most important facts or ideas about something in a short and clear form

We might also use other command words but these will be:

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- commonly used words whose meaning will be made clear from the context in which they are used
- subject specific words drawn from the unit content.

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OCR-set Assignment

Sample Assessment Material

Teacher/Technician Advice

OCR Level 3 Alternative Academic Qualification Cambridge Advanced Nationals in Human Biology

Unit F173: Biomedical techniques

Scenario Title: S1 Pharmaceuticals

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Students will be expected to plan their own investigations. It is essential that teachers check the methods and risk assessments prior to students conducting any practical work to ensure the students have chosen equipment and reagents available at the centre and that their methods and reagents are safe to use.

Below are details of how to prepare the samples for patients A–C. Appropriate labelling should be added to the samples provided to students and the students should **NOT** be made aware of the details in this document.

Students will require access to all equipment and reagents used throughout Unit F173. In addition, they will likely need access to 2,6-dichlorophenolindophenol (DCPIP), ninhydrin, and Benedict's quantitative reagent.

Sample 1 – urine sample. Addition of an appropriate colourant could be useful, e.g. yellow food colouring.

To one litre of deionised water add:

- Urea: 9.3 g
- Sodium chloride: 1.87 g
- Potassium chloride: 1.3 g
- Glucose: 1.5 g
- Vitamin C: 35 cm^3 of 2 g / L solution
- 0.01 M HC/: adjust pH of solution to ~pH 5.3

Sample 2 – plasma sample. Addition of an appropriate colourant could be useful, e.g. yellow food colouring, but a slightly darker colour than the urine sample.

To one litre of deionised water add:

- Phenylalanine: 5 g
- Sodium carbonate: 3 g
- Glucose: 1.0 g
- Vitamin C: 7.5 cm^3 of 2 g / L solution

Sample 3 – plasma sample. Addition of an appropriate colourant could be useful, e.g. yellow food colouring, but a slightly darker colour than the urine sample.

To one litre of deionised water add:

- Sodium carbonate: 3 g
- Calcium chloride: 10 cm^3 of 21.9 g / L solution
- Glucose: 1.0 g
- Vitamin C: 1.25 cm^3 of 2 g / L solution

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